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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,248	04/11/2005	Hideharu Itatani	122430	9181
25944	7590	06/26/2007		
OLIFF & BERRIDGE, PLC P.O. BOX 19928 ALEXANDRIA, VA 22320			EXAMINER EVERHART, CARIDAD	
			ART UNIT 2891	PAPER NUMBER
			MAIL DATE 06/26/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/521,248	Applicant(s) ITATANI ET AL.	
	Examiner Caridad M. Everhart	Art Unit 2891	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-20 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____. |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date <u>5-11-1006</u> . | 6) <input type="checkbox"/> Other: ____. |

Claim Rejections - 35 USC § 102

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-11,13,15-20 are rejected under 35 U.S.C. 102(e) as being anticipated by Chung et al (US 2004/0018304A1).

Chung et al disclose an apparatus and the process of disposing a substrate within a chamber, the substrate being a semiconductor wafer which may be silicon(paragraph 0032), the gas is activated remotely from the chamber(paragraph 0035), the precursor is pulsed to the chamber(paragraph 0040). An activated reducing gas which is activated remotely from the chamber may be provided to the chamber(paragraph 0046 and 0047). The steps are repeated(paragraph 0049). The precursor and the reducing gas may be activated (paragraph 0050). A metal may be deposited(paragraph 0057) or a metal compound(paragraph 0057). The thickness of the layer is within the recited range and the film formed may be a TiN barrier layer(paragraph 0057). The reducing gas may be NH₃(paragraph 0053). The precursor may be TDMAT, which satisfies the limitation of claim 13(paragraph 0052). The temperature is within the recited range(paragraph 0038). There is a microprocessor controller which regulates the reactor and the gas injection(paragraph 0020). Carrier gas alternates with the reactive gases(paragraph 0031). The process

chamber includes a heated substrate pedestal(paragraph 0019). The gas may be supplied not activated and the activation may be within the chamber (paragraph 0026).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al as applied to claim 1 above, and further in view of Raaijmakers et al (US 2001/0024387A1).

Chung et al is silent with respect to the recited tantalum compound.

Raaijmakers et al discloses the recited tantalum compound as a precursor for vapor deposition(paragraph 0075 and 0094).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the recited compound because Raaijmakers teaches the equivalence of the recited compound and Ta(NCH₃)₅ (paragraph 0075) which is a compound taught by Chung et al for the same purpose(paragraph 0052).

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chung et al as applied to claim 1 above, and further in view of Yang (US 6,617,248).

Chung et al does not teach the recited ruthenium compounds.

Yang et al discloses forming a ruthenium oxide layer using bisethylcyclopentadienylruthenium(col. 2,lines 65-67 and col. 3, lines 1-5).

It would have been obvious to one of ordinary skill in the art would have been obvious to one of ordinary skill in the art to have used the precursor taught by Yang et al in an ALD as taught by Chung et al because the precursor taught by Yang et al satisfies the criteria for a precursor taught by Chang et al (paragraph 0006) and because ALD requires lower temperatures than CVD.

The prior art of record not relied upon is considered relevant to applicant's disclosure.

Art Unit: 2891

Hunt et al(US 6,500,350)

Hunt et al discloses Ti(acac)(titanium acetylacetonate) for the vapor deposition of titanium and titanium compounds(col. 23, lines 10-13).

It would have been obvious to one of ordinary skill in the art at the time of the invention to have used the compound taught by Hunt et al in the method taught by Chung et al because this compound is an organic titanium precursor, and Chung et al teaches that any appropriate titanium precursor may be used(paragraph 0052).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Caridad M. Everhart whose telephone number is 571-272-1892. The examiner can normally be reached on Monday through Fridays 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, B. Baumeister can be reached on 571-272-1722. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Art Unit: 2891

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.


CAROLAD EVERHART
PRIMARY EXAMINER

C. Everhart
6-22-2007